

FAIL-SAFE CRYOPUMP SAFETY PURGE DELAY

ABSTRACT OF THE DISCLOSURE

An electronic controller is integral with a cryopump and provides an offline
5 solution for purging a cryopump and an exhaust line during unsafe conditions. The
electronic controller is responsible for controlling the opening and closing of purge,
exhaust purge and gate valves coupled to the cryopump. The electronic controller can
preempt any attempts from other systems to control these valves during unsafe
conditions. An unsafe condition can be a power failure in the cryopump, a dangerous
10 temperature in the cryopump or a temperature sensing diode that is not operating
properly. When an unsafe condition is determined, the exhaust purge valve is opened
and the gate valve closed, while the opening of a purge valve may be delayed for a safe
period of time. If the unsafe condition still exists when the safe period of time elapses,
the purge valve is allowed to open.

15 A fail-safe purge valve release and time delay mechanism can be used to ensure
that the purge valve opens after the period of time elapses. Electrochemical capacitors
store an amount of energy to hold a normally open purge valve closed for a safe period
of time. When this energy is discharged and the unsafe condition still exists, the purge
valve automatically opens.